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IS 9171 (1979): Code of practice for maintenance and use of friction and hydraulic props and link bars [MED 8: Mining Techniques and Equipment]

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(Reaffirmed 1999)

Indian Standard

CODE OF PRACTICE FOR MAINTENANCE AND USE OF FRICTION AND HYDRAULIC PROPS AND LINK BARS

1. Scope — Lays down the recommendation for proper maintenance and use of friction and hydraulic props and link bars so as to achieve maximum efficiency from them.

2. General

2.1 The manufacturer shall supply an instruction manual with each lot of 50 props/link bars or part thereof. The instruction manual shall include the possible problems which may be encountered during the use of props or link bars and shall also suggest the remedial measures.

2.1.1 The instruction manual shall also indicate the main faults and their possible causes that can be removed only at the surface workshops. The manual shall also indicate the remedies for these faults.

2.2 The mine, on receipt of the link bar or prop from the manufacturer, shall identify them with a code number which shall be clearly marked on the link bar or prop.

2.2.1 The code number shall be marked on the link bar or prop in such a way that it may be examined easily throughout the period of its use in mines.

2.3 The code number allotted in accordance with requirement of **2.2** above shall be recorded in a book along with other information such as name of manufacturer, serial number, extended length, etc.

2.3.1 This record book shall also indicate the results of any test and maintenance done on the link bar or prop.

3. Storage

3.1 Friction and hydraulic props shall be stored with their inner members in completely closed position so as to prevent the working surfaces of the inner members from being damaged.

3.2 The props and link bars shall be stacked in suitable brackets such that the props or bars are not subjected to the dead weights of other props or bars.

3.3 The props and bars of the same type and size shall be stacked together in a convenient place.

3.4 Props and bars shall be stored in a clean and dry place to minimize corrosion.

3.5 Props and bars when stored underground during their use shall be stored at a clean place free from the possibility of contamination with water and other foreign material.

4. Transport

4.1 The props shall be transported in completely closed position.

4.2 During transportation rough handling of the props and bars shall be avoided as far as possible. Special care shall be taken in case of hydraulic props.

4.2.1 Care shall be taken to avoid damage to any of the part.

4.3 When transporting the props and bars through haulage system, small groups of props and bars shall be transported at a time so as to avoid damage to the parts due to the inter-action of the props and bars due to vibration.

5. Setting

5.1 *Friction Props*

5.1.1 The props shall be laid on the ground at the site of erection and the prop shall be extended to the required working height or slightly less by drawing out manually the inner member from the outer member of the prop.

Mining Sectional Committee, EDC 50; Roof Supports Subcommittee, EDC 50 : 8 [Ref : Doc : EDC 50 (3008)]

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5.1.2 The clamp unit of the prop shall then be locked by hammering the locking wedge adequately so that the inner member will not fall due to its weight when the prop is erected.

5.1.3 The prop shall then be lifted and set vertically or inclined as required at the site under the link bar and the setting devices shall be introduced on the prop.

5.1.4 The setting device shall now be operated to apply a small load so as to support the inner member and then the locking wedge shall be released to make the inner member free.

5.1.5 The setting device shall now be operated continuously to lift the inner member to the maximum possible height till it fits the link bar. Further operation of the setting device will induce initial setting load in the friction prop.

5.1.5.1 During the setting, care shall be taken to ensure that the crown of the prop matches with the corresponding support point on the link bar.

5.1.5.2 Care shall also be taken to ensure that the direction of the locking wedge is placed at a convenient angle to the face so that smaller end of the locking wedge is towards the face.

5.1.5.3 Care shall also be taken to ensure that the prop is erected in the desired position as far as possible and is having a maximum possible contact between the top of the crown of the prop and the bearing surface of the link bar. A full contact between the crown of the prop and the bearing surface of the link bar is the most desirable position.

5.1.6 After the initial setting load is applied, the locking wedge of the prop shall be finally rammed according to the instructions of the manufacturers as laid down in the manual supplied along with the props.

5.1.6.1 In the case of multiple locking wedges, they shall be hammered one after another serially.

5.1.7 After the final hammering, the setting device shall be withdrawn from the prop. The prop is now ready for taking the roof load.

5.2 *Hydraulic Props*

5.2.1 *Props with closed hydraulic system*

5.2.1.1 The prop shall be placed vertically and extended manually as far as possible to the required working height by pushing up the inner member and keeping the release valve fully open by means of release handle.

5.2.1.2 The prop shall then be extended by operating the pump handle so that the crown of the prop touches the link bars at the proper place and initial setting load shall be induced by further operation of the pump handle with full effort.

5.2.1.3 The pump handle shall now be removed. The prop is now ready for accepting roof load.

5.2.2 *Props with external feed* — The prop is placed in the desired position and is extended by means of a setting gun from external feed. After the crown of the prop touches the link bar, the full initial setting load is applied through the fluid to make the prop ready for taking the roof load.

5.3 *Link Bars*

5.3.1 While setting the link bars care shall be taken that they are always placed perpendicular to the face with their female end pointing towards the face and male end pointing towards the goaf.

5.3.2 The link bar shall be made to touch the roof swivelling the bar in the vertical plane at the joint with the other bar by wedging at the joint.

5.3.2.1 As far as possible the bar shall be set without any tilt so as to achieve a complete contact between the upper surface of the bar and the roof.

5.3.3 If it is not possible to support the first row of bars as in case of prop-free-front type of support, the bar shall be made cantiliver by putting the shackle or by hammering the locking wedges at the joints.

5.3.4 As soon as the link bar is supported by setting a prop below it, the locking wedge or the shackle shall be released so that the joint is hinged and does not carry any bending moment.

5.3.5 In case of bars provided with single support point, the bar shall be set in the specified position. But in case of bars with multiple support point, the bar shall be set, as far as possible, at a position one-third of the nominal length of bar from the male end.

6. Withdrawal — The withdrawal operation shall be carried out from a safe distance and in such a way to avoid injury to the persons.

6.1 *Friction Props* — The friction prop shall be withdrawn by hammering the locking wedges of the prop to release the friction grip of the clamp unit.

6.2 *Hydraulic Props* — Under safe conditions, the prop shall be withdrawn by pulling the release handle in case of props with closed hydraulic system and by the use of withdrawal hook in case of props with external feed. Under unsafe condition, the prop shall again be released by means of suitable safety devices.

6.3 *Link Bars* — Along with the lowering of the props, the link bar will automatically hang down from the hinge at the joint. The pin at the joint may be slightly tapped to make the bar completely free from the bar it was coupled with.

7. Maintenance

7.1 *Friction Props*

7.1.1 As far as possible, the props shall be kept clean and the inner member shall not be allowed to come in contact with oil, grease or any other sticky substance.

7.1.2 If any deformation or other damage is noted during the use of the props they shall be immediately replaced.

7.1.3 0·5 percent, minimum being three props, of all the props used in the mine shall be replaced every three months. The props thus replaced shall be tested for any defect at the mine workshop in the manner laid down in the instruction manual supplied by the manufacturer with the prop. The result of these tests shall be recorded in the book maintained for the purpose in accordance with **2.3** and **2.3.1**.

7.2 *Hydraulic Props* — Ten percent of all the props used in the mine shall be replaced every three months. The props thus replaced shall be brought out of mine and shall be tested for any defect at the mine workshop in the manner laid down by the manufacturer in the instruction manual supplied by them along with the prop. The result of all such tests shall be recorded in the book maintained for the purpose as required under **2.3** and **2.3.1**.

7.2.1 The inner member of the prop shall be lubricated periodically as per the maintenance instructions of the manufacturer.

7.2.2 The props while in use shall be regularly checked for the following:

a) *Oil level* (*For props with closed hydraulic system*) — It shall be checked by pumping the prop to its full extended length. In case, the prop cannot be extended fully, the prop shall be sent to the surface for refilling.

b) *Leakage of oil* — A prop shall be laid horizontally at a plane surface and shall be examined for any leakage of the oil. In case of leakage, the oil seals shall be replaced.

7.2.3 In case of damage, to any component of the hydraulic prop, the prop shall be sent to the workshop for repairing.

7.3 *Link Bars*

7.3.1 Link bars, if bent by 20 mm during use shall be straightened by means of a press before they are re-used. However, if any crack is developed either during use or during straightening process, the link bar shall be discarded.

7.3.2 In case the locking wedges and the pin of the link bars are bent, they may be straightened by means of press and re-used. However, if any crack is developed either during use or during straightening process, the locking wedge or the pin shall be discarded.

7.3.3 Reversible link bars, if used, may be re-used in reverse position wherever possible in conformity with the recommendations laid down by manufacturer in the instructions manual.

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